

Exhibit 2

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

IN RE: PROCESSED EGG PRODUCTS
ANTITRUST LITIGATION

MDL Docket No. 2002
08-md-02002 (GP)

THIS DOCUMENT RELATES TO:

The Kroger Co., et al v. Sparboe Farms, Inc., et al, Case No. 2:10-cv-06705 GP (E.D. Pa.)

Giant Eagle, Inc. v. Sparboe Farms, Inc., et al, Case No. 2:11-cv-00820 GP (E.D. Pa.)

Supervalu Inc. v. Sparboe Farms, Inc., et al., Case No. 2:10-cv-06736 GP (E.D. Pa.)

Publix Super Markets, Inc..v. Sparboe Farms, Inc., et al, Case No. 2:10-cv-06737 GP (E.D. Pa.)

Kraft Foods Global, Inc. et al v. United Egg Producers, Inc. et al, Case No. 1:12-cv-00088 GP (E.D. Pa.)

Winn-Dixie Stores, Inc., et al. v. Cal-Maine Foods, Inc., et al., Case No. 2:11-cv-00510-GP (E.D. Pa.)

EXPERT REPORT OF MICHAEL R. BAYE, PH.D.

Highly Confidential – Subject to Protective Order

January 22, 2015

Highly Confidential – Subject to Protective Order

120. During the first phase, the UEP demonstrated to members the theoretical benefits of an industry-wide reduction in output.¹⁷¹ As a result of these explicit communications, members gained a common understanding that small reductions in supply would translate into large price increases.¹⁷²

121. This first phase was accompanied by a second phase in which the UEP and USEM experimented with alternative “voluntary” measures to reduce supply and increase prices. These included calls for early molting of flocks,¹⁷³ emergency flock reductions,¹⁷⁴ and early attempts to coordinate exports.¹⁷⁵ While the documentary record indicates that these calls for early molting, slaughter and exports induced some participants to comply, the effects from these programs were temporary and imperfect. This is consistent with economic theory. In the absence of monitoring, audits, and punishment for noncompliance, if a firm believed other firms would comply and engage in early molting, slaughter, and participate in export programs, it would enjoy higher prices and profits if it did not comply. While some documents indicate that these early efforts did result in short-term increases in prices and profits, documents also indicate that they were not sustained.¹⁷⁶

¹⁷¹ 1992: “UEP’s responsibility should be to ‘preach’ restraint (as it has been for the past several years).” (BELL-D-00033060-7, at BELL-D-00033060.) 1994: “The U.S. has no way to control its flock size other than through the persuasive influence of trade associations such as the UEP. On-going efforts to warn the industry of impending over-production and industry cooperation to correct the problem before it becomes one means “money in the bank” for the entire industry. Remember – in the egg industry, “more means less” – it always has and it will always be so.” (JEN00000067-70, at JEN00000070.) 1999: “Mutual restraint is necessary to accomplish the target numbers associated with reasonable egg prices – year in and year out.” (JEN00002303-6, at JEN00002306.)

¹⁷² See ¶¶37-38 and 51-52.

¹⁷³ November 2001: “It was at that time [early in 2000] that the United Egg Producers (UEP) recommended a flock reduction strategy, and producers responded, culling and molting early and delaying or reducing replacements.” (CM00412623-8, at CM00412623); December 1999: “By no later than January 1st [of 2000], each member should molt 5% of their flock.” (UE0064381-6, at UE0064382.)

¹⁷⁴ November 2001: “UEP, which represents about 80% of production, has now urged an emergency flock reduction of 5%.”; “UEP’s emergency plan asks producers to begin running 100,000-hen houses at 95% of capacity by de-stocking one bird per cage until houses reach the 95% capacity goal.” (CM00412623-8, at CM00412624); December 1999: “During 2000, each member should reduce their placement of baby chicks by 6%... By no later than January 1st, each member should reduce their flock by 5% and maintain this through July 1st.” (UE0064381-6, at UE0064381-2.)

¹⁷⁵ “Q: And now you understand that this United Voices in February of 2000, this is during the time that UEP still itself coordinated exports through the Export Committee? Are you aware of that? ...A: I don’t know. I don’t believe they did, but according to this they did in conjunction with United States Egg Marketers.” (DAY0033370-848, at DAY0033667-8); February 2003: “During times of the year when demand for eggs is low, exporting has proven to be very helpful...These 61 companies understand the impact an export, at the right time and the right number of loads, can benefit the industry.” (DAY0017500-509, at DAY0017502.)

¹⁷⁶ June 2004: “Ken Looper is now estimating the layer flock inventory will be nearly 9 million hens larger by the end of the year 2004, than it was at the year’s end 2003. What happened while I must have been asleep? Did the egg market demand suddenly grow by the volume of production from an additional 9 million hens? Did egg producers suddenly decide they just

122. During the second phase, the UEP initiated its first cage space restrictions in April 2002, as discussed in Section VI. These restrictions evolved over time; they were tightened four times between October 2003 and April 2008, and the April 2008 restrictions are still in place today. Additionally, the 100 percent rule was memorialized in the edition of the UEP Guidelines published in 2003 and added the requirement that each producer submit monthly compliance reports to be UEP Certified.

123. The final phase of the conspiracy began around February 2005, and is still in effect today. During this phase, the UEP augmented its tightened cage-size restrictions with restrictions on backfilling, as discussed in Section VI. In addition, in 2006 the UEP enhanced restrictions on commingling Certified and non-certified eggs such that commingling would result in automatic failure of the audit (and, thus, decertification of *all* eggs sold by that producer).

B. The UEP Guidelines Evolved Over Time

124. Building upon the structure of guidelines established in 2002, the UEP issued new editions in 2003, 2004,¹⁷⁷ 2005,¹⁷⁸ 2006, 2008, 2010, and, most recently, 2014. The 2003 edition included a new section on “Requirements for Animal Care Certified Companies.” This section made explicit the rule that every certified company must implement the guidelines on 100 percent of the company’s production facilities (the “100 percent rule”) and submit a “Monthly Compliance Report” to the UEP.¹⁷⁹ The Monthly Compliance Report consists of a series questions asking for a yes or no answer and a table to be filled out showing, by hen house, the number of cages, amount of space, number of layers, and space per bird.¹⁸⁰ The information provided in the table allowed the UEP to monitor changes in flock size in ways that were not possible under the 2002 edition of the guidelines.

didn’t want to sell eggs for \$1.00 or more?” (CM00561731-41, at CM00561732); February 2003: “They are so committed to USEM and exporting that they are willing to pay their share even though non-members benefit without contributing...[w]ithout better participation, future export opportunities are questionable.” (DAY0017500-509, at DAY0017502.)

¹⁷⁷ The 2004 edition of the UEP Guidelines established an auditing procedure for non-certified companies that wished to market Certified eggs. (UE0211356-72 at UE0211370, MFI0616041.)

¹⁷⁸ The UEP issued two versions of the 2005 edition. The second version changed the name of the certification program from “Animal Care Certified” to “United Egg Producers Certified.” (UE0242998-3016; CM00498685.)

¹⁷⁹ UE0809972-88 at UE0809986.

¹⁸⁰ See, e.g.: CM00269032 – 6.

certified, UEP Certified, organic, cage free, and other specialty flocks. My analysis of egg production allows for increases in the productivity of hens, expansion by current producers, entry by new producers, as well as demand- and supply-side substitution.

149. I use data for the period from 1990 to 2012 to avoid potential biases in my analysis. In particular, an econometric analysis of the potential economic impact of the alleged conspiracy requires data before the alleged conspiracy began. It is important, however, that one not use data too far back in time, since this could bias results owing to structural changes in the industry (e.g., significant shifts in the size and composition of producers, their technologies, and so on). The first dedicated egg processing facility opened in the early 1990s, so data before this period likely was generated under a different setting.²¹³ The period following 1990 also represents a sustained period in which consumers followed high-protein, low-carbohydrate diets.²¹⁴ Additionally, only 46 Urner Barry prices I reviewed are available before 1990.

150. I end my analysis in December 2012 because of unique, potentially significant events that could have impacted flock size and production in 2013 and beyond. This is not to say that the alleged conspiracy ended in 2012, but rather that these events preclude me from reliably estimating potential post-2012 effects of the alleged conspiracy. Specifically, California Proposition 2, which passed in November 2008, takes effect in 2015. This law requires significantly different cage space standards for all eggs produced in California.²¹⁵ Companion Bill AB 1437, which passed in July 2010, requires all eggs sold in California beginning in 2015 to meet this standard regardless of where they are produced.²¹⁶ According to Donald Bell, due to the large quantity of eggs consumed in California and the law's impact on out-of-state producers,

²¹³ Gideon Zeidler, "Further-Processing Eggs and Egg Products," in *Commercial Chicken Meat and Egg Production*, 5th Edition, ed. Donald Bell and William Weaver, 2002, p. 1164.

²¹⁴ "Egg consumption had been growing steadily from its low point in 1991, with the recent surge largely because of the popularity of the high-protein diets, economists said." (Los Angeles Times, "Egg Industry's Profits Get Lean," <http://articles.latimes.com/2005/nov/05/business/fi-eggs5>. Accessed November 24, 2013). See also: Legacy, "Robert Atkins Obituary," <http://www.legacy.com/Obituaries.asp?Page=LifeStory&PersonId=945330>. Accessed November 23, 2014.)

²¹⁵ Frank Morris, "States Fight California's Chicken Cage Law. But It's Really About Bacon," NPR, available at: <http://www.npr.org/blogs/thesalt/2014/03/07/286811197/poultry-farmers-to-fight-back-on-california-cage-free-egg-law>. Accessed January 21, 2015.

²¹⁶ Senator Florez, California Bill AB 1437, available at: http://leginfo.ca.gov/pub/09-10/bill/asm/ab_1401-1450/ab_1437_bill_20100706_chaptered.html. Accessed December 8, 2014.

producers around the country would need to build new facilities to maintain supply levels.²¹⁷ If this is correct, producers might have started planning and constructing new facilities in anticipation of the changes occurring in January 2015. In light of the three to five years it takes to plan, permit and construct new facilities and fill them with producing laying hens, these laws might have impacted production after 2012.

151. With this overview, I now turn to the results of my econometric analysis.

A. Econometric Analysis Is Consistent with the Alleged Conspiracy Reducing Flock Size

152. Exhibit 11 shows U.S. flock size from 1990 through 2012, with one trend line for the period before August 2002 (when the first cage restriction could have impacted the number of laying hens) and a second trend line for the period after. These trend lines indicate an economically and statistically significant change in flock size beginning at the time the first cage restriction published in the UEP Guidelines took effect.²¹⁸ While there was a modest increase in flock size between 2002 and 2012, the rate of increase in flock size has been lower since 2002. The difference in these trends is statistically significant, and would lead one to reject the hypothesis that the alleged conspiracy had no effect on flock size, in favor of the hypothesis that the alleged conspiracy led to a reduction in flock size relative to the but-for world.

153. In order to account for the possibility that this decline stemmed from events unrelated to the alleged conspiracy (e.g., benign changes in demand or supply), I use accepted scientific methods to control for other factors that, theoretically, might have contributed to the reduction in flock size growth documented in Exhibit 11.

154. More specifically, I use a standard reduced form econometric model to examine whether the decline observed in Exhibit 11 stems from coordinated actions of the Defendants (e.g., UEP cage and backfilling restrictions) or unrelated events (e.g., changes in other determinates of supply or demand). This accepted methodology recognizes that the equilibrium flock size may be influenced by exogenous variables (e.g., variables that are outside of the

²¹⁷ Donald Bell, “California’s Egg Requirement -2015” in *Eggs Economics Update #338*, 2013, p. 2.

²¹⁸ Each trend line is obtained from regressing flock size on time. The coefficients on the trend lines are statistically different from one another at the 1% significance level.

maintained hypothesis that the alleged conspiracy had no effect on egg production.²⁴⁹ Expressed less formally, the data indicate that the alleged conspiracy—not benign changes in demand or supply—reduced the number of eggs available for human consumption in the US.

172. Similar to the analysis of flock size, the coefficients for Restrictions 1 through 5 in the Main Specification in Exhibit 16 are negative, which indicates that each of these restrictions reduced egg production relative to what production would have been “but for” the restrictions. The magnitude of the impact of the restrictions on egg production is slightly lower than the effects on flock size, which is consistent with increased productivity.

173. As was the case with my analysis of flock size, the magnitude of the coefficients for Restrictions 1 through 5 in Column (b) of Exhibit 16 tend to increase in absolute value. The coefficient on Restriction 5, however, is slightly lower than Restriction 4. This is consistent with the fact my model allows for expansion or entry by new or existing producers and does not assume the alleged conspiracy was perfect at all times. The results indicate that, relative to what egg production would have been “but for” the alleged conspiracy:

- a. egg production was 0.2 percent lower when Restriction 1 was in effect (August 2002—January 2004);²⁵⁰
- b. egg production was 0.6 percent lower when Restriction 2 was in effect (February 2004—July 2005);²⁵¹
- c. egg production was 2.4 percent lower when Restriction 3 was in effect (August 2005—January 2007);²⁵²
- d. egg production was 5.5 percent lower when Restriction 4 was in effect (February 2007—July 2008);²⁵³ and

²⁴⁹ An F-test on the joint hypothesis that all five indicators are zero is rejected at the 1% significance level. As shown in Exhibit 16, this is also the case for the other specifications.

²⁵⁰ Since $\exp(-0.002)-1 = -0.2$ percent.

²⁵¹ Since $\exp(-0.006)-1 = -0.6$ percent.

²⁵² Since $\exp(-0.024)-1 = -2.4$ percent.

²⁵³ Since $\exp(-0.056)-1 = -5.5$ percent.

e. egg production was 5.2 percent lower when Restriction 5 was in effect (August 2008—December 2012).²⁵⁴

174. The results in Exhibit 16 also indicate that the statistical significance of these estimates increases from Restriction 1 to Restriction 5. For example, while the estimated reductions in egg production stemming from Restrictions 1 and 2 are not statistically different from zero at standard significance levels, the estimated effects of Restrictions 3, 4 and 5 are each statistically significant at the 1 percent level.²⁵⁵

175. It is noteworthy that, as was the case with flock size, the estimated reductions in egg production are not only largest, but highly statistically significant, for Restrictions 3, 4 and 5—periods in which the backfilling ban was fully in place, and adjustments were made to enhance compliance with the UEP Guidelines. This is consistent with the results in the Backfilling Ban Specification of Exhibit 16: If one maintains the hypothesis that aspects of the alleged conspiracy occurring before the backfilling ban (e.g., cage-size restrictions) did not impact egg production, but uses a single indicator for the period following the backfilling ban, one finds that egg production declined by 2.1 percent.²⁵⁶ Thus, my finding that the alleged conspiracy led to reductions in egg production relative to what egg production would have been “but for” the alleged conspiracy holds even if one focuses exclusively on the timing of the backfilling ban. As shown in Exhibit 8 and discussed in Section X above, the UEP implemented new measures around the same time as the backfilling ban that likely contributed to this effect.

176. Similar to the analysis of flock size, the Main Specification, while parsimonious, explains over 99.1 percent of the variation in (log) egg production during the period, and the estimated coefficients on the controls are consistent with economic theory.²⁵⁷ As shown in the other specifications in Exhibit 16, my main conclusions are robust to the inclusion of a variety of other controls (including the prices of soybeans and corn individually, diesel prices, agricultural

²⁵⁴ Since $\exp(-0.053)-1 = -5.2$ percent.

²⁵⁵ Roughly, one percent significance means that there is less than a one percent chance that the regression results find that Restrictions 3, 4 and 5 had an effect on production, when in fact these Restrictions had no effect on production.

²⁵⁶ Since $\exp(-0.021)-1 = -2.1$ percent.

²⁵⁷ For example, increases in feed costs reduce the equilibrium egg production, while increases in real GDP (e.g., increases in income or the population) result in a greater equilibrium egg production level. The price of electricity does not have a statistically significant effect on egg production.

wages, the TED spread, Federal Funds interest rates, and population), alternative lag structures,²⁵⁸ and allowing for both linear and quadratic time trends which would capture changes over time in consumer preferences. I note that all of the specifications in Exhibit 16 allow for the possibility that changes in other excluded or unobserved factors impacted the equilibrium number of eggs produced, and allow the influence of these other factors to be independent as well as correlated over time.

177. Exhibit 17 uses the estimated coefficients from the Main Specification to plot actual egg production and the estimated number of eggs that would have been available “but for” the alleged conspiracy. The solid blue line represents actual egg production, while the dashed red line represents the estimated number of eggs but for the alleged conspiracy. It is clear from this visualization of the regression results that, beginning with Restriction 3, which starts in August 2005, but-for egg production diverges significantly from actual egg production. I note that this visualization of but-for egg production controls for other factors that influenced demand and supply during the period.

178. To summarize, there is strong econometric evidence that the alleged conspiracy led to statistically and economically significant declines in the equilibrium number of eggs produced. The patterns observed in my econometric analysis are broadly consistent with the documentary record on the evolution of the alleged conspiracy.

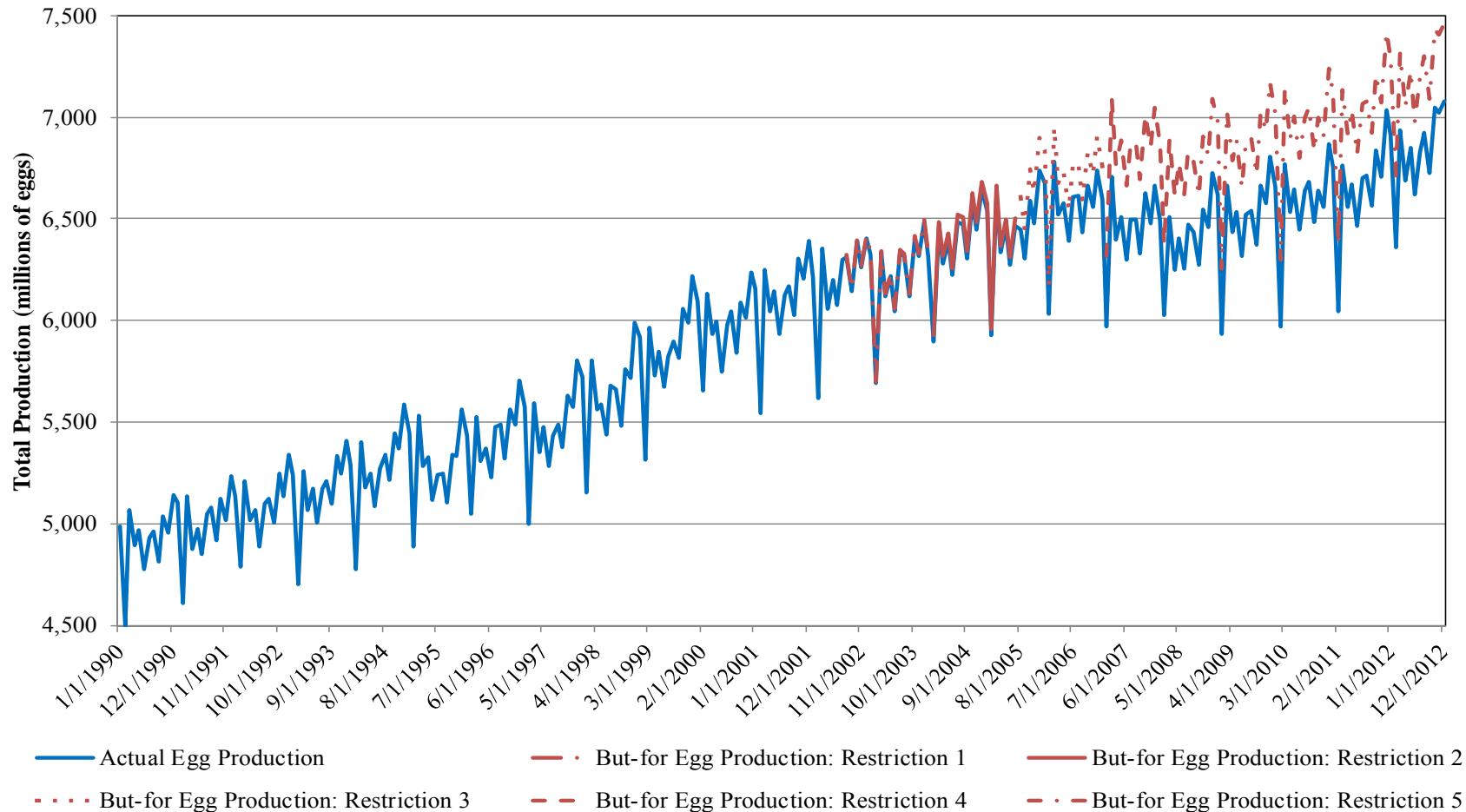
C. Further Robustness Checks

179. The reduced form econometric models described above estimate the impact of the alleged conspiracy using structural parameters that coincide with the documentary record regarding the timing of cage-size and backfilling restrictions (e.g., the indicators for Restrictions 1 through 5). As a further robustness check, I also estimated vector autoregressive (VAR) models of flock size and egg production. This econometric approach makes no structural assumptions regarding the timing or avenue through which the conspiracy impacted flock-size or egg production.

²⁵⁸ Columns (e) and (f) in Exhibit 16 use the five and zero lags, respectively.

Exhibit 17
Actual Egg Production vs. But-for Egg Production
Main Specification

1990 - 2012



Source: USDA.